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INDIANA'S LAKE MICHIGAN CREEL SURVEY RESULTS 2003

INTRODUCTION

Since 1969, The Indiana Department of Natural Resources (IDNR), Division of Fish and Wildlife has stocked trout and salmon along the southern shoreline of Lake Michigan to enhance the sport fishery. The area stocked extends from Whiting to Michigan City and includes sites along the St. Joseph River, Trail Creek and the East Branch of the Little Calumet River. The number of trout and salmon stocked 1999 through 2003 ranged from 969,559 to 1,199,209 and averaged 1,103,731 fish per year (Table 1).

Table 1. Number of trout and salmon stocked in Lake Michigan by Indiana Department of Natural Resources, 1999 through 2003.

Species	1999	2000	2001	2002	2003
Chinook	415,419	417,776	450,715	253,000	232,395
Coho	146,882	157,208	157,048	224,797	233,248
Steelhead	571,573	394,575	591,446	605,181	591,991
Brown	0	0	0	35,000	40,400
TOTAL	1,133,874	969,559	1,199,209	1,117,978	1,098,034

Indiana also has a trout and salmon program on the St. Joseph River, a tributary to Lake Michigan. The catch, harvest and effort estimates presented in this report are exclusive of the St. Joseph River project.

The 2003 creel survey was conducted from March to December. Data were collected by interviewing anglers at four sites along the Indiana shoreline of Lake Michigan (Hammond, East Chicago, Burns Waterway/Portage, Michigan City) and several sites along Trail Creek, the East Branch of the Little Calumet River and Salt Creek. The survey of anglers fishing from boats and piers was conducted April 1 through October 31. Catches and effort by stream anglers were recorded in March and July 1 through December 31. These time frames represent the periods when the majority of the fishing population can be reached.

Due to Indiana's close proximity to neighboring states' borders (Illinois and Michigan), and the migratory nature of trout and salmon, many boat trips were actually conducted in other states' waters. The estimates provided in this report represent estimates of fish returned to Indiana ports. Only a subset of all fishing locations are included in the creel survey. Harvest and effort are not expanded to non-surveyed areas. Thus, this yearly assessment of fish harvest and fishing pressure provides an index of fishing quality.

RESULTS

In 2003, a total of 3,939 angler interviews (representing 7,809 anglers) were conducted to determine how many hours they fished, the species of fish they preferred to catch, and the number of species of fish caught (harvested and released).

Lake Michigan boat anglers fished out of Indiana ports an estimated 300,994 hours and harvested 461,269 fish during 2003. Most fishing was done from boats; 69.9% of the angler hours (Table 2) and 89.9% of the catch (Table 3).

Table 2. Estimated angler hours from the IDNR Lake Michigan creel survey during 2003, based on total effort.

Boat anglers	300,994	(69.9%)
Shore anglers	39,966	(9.3%)
Stream anglers	89,393	(20.8%)
TOTAL	430,353	

Table 3. Estimated catch from the IDNR Lake Michigan creel survey during 2003, based on total effort.

Boat anglers	461,269	(89.9%)
Shore anglers	45,461	(8.8%)
Stream anglers	6,557	(1.3%)
TOTAL	513,287	

Boat fishing effort was highest in June (77,336 hours), followed by May (68,664 hours) and July (51,457 hours). June (11,871 hours), July (9,835 hours) and April (5,095 hours) were the months of greatest shore fishing activity. Stream anglers fished most in October (21,269 hours), September (19,744 hours) and July (19,326 hours).

Yellow perch ranked first in the catch by number. The salmonid catch was dominated by coho salmon, comprising 72.4% of the total. Steelhead trout harvest was second to coho, with 14.4% of the total, followed by Chinook salmon (10.9%), brown trout (1.5%) and lake trout (0.8%, Table 4).

Table 4. Estimated salmonid and yellow perch catch from the IDNR Lake Michigan creel survey during 2003, based on total effort.

Yellow perch	311,44	
Salmonids	77,569	
	389,01	
coho	56,168	(72.4%)
steelhead	11,204	(14.4%)
Chinook	8,417	(10.9%)
brown trout	1,155	(1.5%)
lake trout	625	(0.8%)

Trout and Salmon

In Indiana waters of Lake Michigan, a strong salmonid fishery during the summer months is typically rare (with the exception of the steelhead fishery), due to the relatively shallow depths and warm water temperatures within Indiana's portion of the Lake. An exception occurred in 2002, with boat anglers experiencing excellent fishing from June through September (Palla 2003). During 2003, however, significant declines in the harvest of all trout and salmon species was common.

The 2003 salmonid season could be classified as mediocre as the harvest of all five trout and salmon species substantially declined compared to the prior fishing season. Harvest ranged between 30% to 70% lower compared to the prior season for lake trout (-69.4%), brown trout (-60.4%), Chinook salmon (-51.0%), coho salmon (-46.3%) and steelhead (-30.0%, Table 5). With boat anglers accounting for nearly 90.0% of the total catch, the number of salmonids boat anglers harvested directly influenced the overall success of the 2003 trout and salmon fishing season.

Table 5. Estimated trout and salmon harvest from the IDNR Lake Michigan creel survey during 1999 through 2003, based on directed effort.

Year	Chinook	Coho	Steel-head	Lake Trout	Brown Trout	Total	Directed Effort (hrs)
1999	8,691	45,465	16,496	2,888	754	74,294	354,481
2000	11,006	76,227	14,968	3,230	2,787	108,218	353,750
2001	7,864	72,171	9,605	3,910	2,244	95,794	334,359
2002	14,483	100,351	13,178	1,221	2,378	131,611	362,228
2003	7,092	53,935	9,223	374	942	71,566	290,486

The first noticeable decline in 2003 began with the boat fishery by late May. For example, 49,588 trout and salmon were harvested by boat anglers during June 2002; whereas, only 8,703 were harvested during June 2003. Salmonid angler effort also significantly declined from 70,673 angler hours (June 2002) to 31,178 angler hours (June 2003).

Furthermore, the notable drop in the stream catch, particularly for Chinook salmon, had an additional impact to the overall 2003 salmonid harvest. The stream catch of all species was either the lowest or one of the lowest observed from the prior eight-year period (Palla 2004). Since the fishing effort between 2002 and 2003 only fell by 3.0%, fish availability and/or environmental conditions were likely reasons for the catch decline.

Throughout 2003, water levels on five of the six major bodies of water monitored by the Corps of Engineers remained below their long-term averages: Lakes Superior, Michigan, Huron, St. Clair and Erie (Department of the Army, Detroit District Corps of Engineers 2003). Huron and Michigan started 2003 about 21-inches below their long-term January average. Lake Michigan water levels peaked in July; however, 23 inches below the long-term July average (Department of the Army, Detroit District Corps of Engineers 2003). Low water levels tend to negatively impact fish returns and angler fishing-success. Indiana, however, was not the only state impacted by low stream water levels. The Wisconsin Department of Natural Resources (WIDNR) experienced the impact first-hand, when the lack of coho salmon running the river resulted in a low collection of coho salmon eggs for rearing. Not only did anglers suffer from the low returns, but it forced the WIDNR to seek assistance from other Great Lakes states to make-up the shortfall for their coho salmon egg collection (Smith 2003).

While Indiana anglers reported mediocre Chinook returns, the opposite was true for the State of Michigan. Anglers on Lake Michigan charter boats experienced an upward trend in Chinook salmon catch rates from popular ports such as Manistee, Ludington and Grand Haven (LeMieux 2004). The increased success in Michigan waters could directly impact Indiana catch rates as those fish are harvested and unavailable for future catch.

For lake trout, the 2003 harvest was the lowest recorded from the prior five-year period (Table 5). Harvest of lake trout has often been more of a function of the availability of other trout and salmon species rather than lake trout abundance. However, population declines due to record-high harvest levels could also be contributing. During 1998, lake trout harvest was at an all-time high when 1.7 million pounds were taken lake-wide (Breidert et al. 2003). This level was the highest on record from the prior fourteen-year period. Preliminary lake wide lake trout data suggests the 2003 lake trout harvest was the lowest on record (Brian Breidert, Indiana Department of Natural Resources, personal communication).

Although the overall salmonid fishery was poor, one positive to the spring fishery (April/May) was the high proportion of steelhead harvested by boat anglers. The 2003 spring harvest of steelhead tripled from 1,857 fish (2002) to 5,838 fish.

Yellow Perch

Boat and shore anglers harvested 207,401 yellow perch, a sizeable increase of 66.4% compared to 2002 (Table 6). The number of hours anglers pursued perch also increased 22.7%, from 97,161 (2002) to 119,200 (2003) hours.

The increases observed in both the catch and effort of yellow perch were likely a function of the availability of trout and salmon and perch. For trout and salmon anglers, the first noticeable drop in catch and effort occurred in late May and June. Salmonid abundance within Indiana waters was poor at this time. By June and July, the yellow perch harvest estimate nearly doubled during 2003 compared to 2002; 142,818 yellow perch versus 79,578 yellow perch. Effort also increased. Thus, the observed increase in yellow perch effort/harvest likely resulted from the unfavorable salmonid fishing. Similar trends were noted from the charter industry. Charter operator salmonid effort increased 37% in June while the harvest declined more than 30% compared to the prior season (Palla 2004). During the 2003 fishing season, 13 trips were conducted solely for yellow perch compared to 2 trips in 2002. The majority of the trips occurred during the month of July.

Boat anglers accounted for the majority of the yellow perch harvest, 93% of the total. June through September were the primary months perch were caught from the lake proper for both boat and shore anglers.

Continued perch surveys in Indiana waters of Lake Michigan have revealed limited evidence that the yellow perch stock is rebuilding (Paul Allen, Ball State University, personal communication). Preliminary summer assessment data (Ball State University) has shown that the majority of the 2003 yellow perch trawl catch was age-5 (1998 year-class) and age-1 (2002 year-class), based on partial analysis of opercles and length frequency distributions (Paul Allen, Ball State University, personal communication). Yellow perch that were of quality size (≥ 200 mm or 8 inches) exceeded 20 fish per hour of collection for the first time in four years, with >90% of that catch female (quality-sized fish being defined as the minimum size at which anglers first catch the species and consider the fish desirable or quality length). For the 2003 Ball State gill net assessment, catch was comprised mostly

Table 6. Estimated yellow perch harvest, catch and effort from the IDNR Lake Michigan creel survey, 1994 through 2003, based on directed effort.

Year	Effort	Harvest	Catch
1994	44,124	66,785	71,920
1995	55,900	69,770	80,312
1996	76,360	137,791	159,168
1997	33,938	32,390	34,532
1998	40,125	37,532	50,494
1999	90,622	132,217	227,304
2000	96,537	129,988	215,382
2001	122,770	140,089	216,341
2002	97,161	124,656	198,275
2003	119,200	207,401	309,561

of the 1995, 1997, and 1998 perch year classes.

The length-frequency graph of sport harvested yellow perch shows the majority of fish anglers take home are within a 7.0 to 12.5-inch range (Palla 2004). Based upon Ball State's preliminary 2003 trawl data, it is likely a large percentage of those quality-sized fish (> 8.0 inches) are females. The impact of sport fish harvest on these females is unknown, however, the reduction in their density may contribute to the already limited recruitment in Southern Lake Michigan.

An additional factor which may negatively impact the perch population is the number of fish caught and released. The 2003 catch of sport-caught perch is approximately 49.0% higher than the harvest. This illustrates that a large percentage of perch were released after capture. Although mortality from handling stress is likely, the magnitude of mortality and it's impact is unknown.

Two potential reasons for a higher catch rates than harvest rates: 1) if fishing is good, anglers continue to catch/release perch after they have reached their bag limit and/or 2) anglers sort their catch while fishing for the larger-sized perch.

Site Comparisons

Fishing effort and harvest varied by site. Michigan City was the port with the highest boat and shore salmonid effort but not the highest trout and salmon harvest (Table 7). Anglers utilizing the East Chicago port accounted for the highest salmonid harvest, even though the salmonid angler effort was over 13% lower than the observed effort at Michigan City.

Annual migration patterns of coho around the southern basin of Lake Michigan begin with spring aggregations in the near shore areas of Indiana and Illinois waters. As water temperatures increase, they move offshore and along the western shore. Movement patterns can be confirmed by comparing the estimated number of coho returned to East Chicago versus other ports.

Highest perch harvest was reported from Michigan City, followed by Burns Waterway and East Chicago (Table 6). Burns Waterway, however, accounted for the highest yellow perch angler effort, followed by East Chicago.

Within the tributaries, Trail Creek accounted for the greatest angler effort and harvest from the three Lake Michigan tributaries surveyed (Table 6).

Anglers fishing the East Branch of the Little Calumet River and Salt Creek continue to release their catch more often than harvesting (Table 6). Seventy-four percent of the fish caught on the East Branch were released, while 56% of the fish caught on Salt Creek were released. Trail Creek anglers were opposite as the majority of their catch was harvested (61% harvested).

Table 6. Estimated harvest of trout and salmon and yellow perch, by site, from the IDNR Lake Michigan creel survey during 2003, based on directed effort.

	Chinook	Coho	Steel-head	Lake Trout	Brown Trout	Yellow Perch	Fishing Effort (salmonids)	Fishing Effort (yellow perch)
LAKE								
Michigan City	2,730	18,423	5,070	195	239	89,519	77,645	30,356
Burns Waterway	995	8,981	734	99	238	44,203	47,412	36,301
East Chicago	2,760	23,622	1,045	80	434	43,091	67,100	34,243
Hammond	186	2,218	75	0	4	30,588	8,936	18,300
STREAM								
Trail Creek	213	502	1,957	0	27	---	67,239	---
E. Branch Cal.	83	29	163	0	0	---	14,005	---
Salt Creek	125	160	179	0	0	---	8,149	---

No. Released	Chinook	Coho	Steel-head	Lake Trout	Brown Trout	Yellow Perch	Total Released
Trail Creek	69	390	1,287	0	18	---	1,764
E. Branch Cal.	409	35	311	0	17	---	772
Salt Creek	278	113	183	0	0	---	583

Table 7. Estimated number of black bass harvested and released by boat and shore fisheries from the IDNR Lake Michigan creel survey during 2002 and 2003, based on total harvest and directed effort.

		No. Harvested	No. Released*	Directed Effort (hrs.)
2002	Boat	111	sub-legal = 9,022 legal = 7,606	18,257
	Shore	132	sub-legal = 438 legal = 207	2,101
2003	Boat	367	sub-legal = 1,253 legal = 4,220	13,794
	Shore	78	sub-legal = 902 legal = 135	1,850

*minimum size limit = 14 inches

Black Bass Species
A total of 6,955 black bass (mainly smallmouth) were caught from the boat and pier fisheries during 2003 (Table 7). Most fishing occurred from boats, accounting for 84.0% of the catch and 88.0% of the effort.

Both shore and boat bass anglers continue to release the majority of the fish they catch. Of the smallmouth caught by shore and boat anglers, 93.6% of those were released. Boat anglers released 93.7% (5,473) of their catch while pier/shore anglers released 93.0% (1,037).

The 2003 catch decreased 60.3% compared to the 2002 catch of 17,516 fish. Effort, though, only fell 23.2% between 2002 and 2003 (Table 7). Boat anglers accounting for the greatest one-year change.

During 2003, yellow perch abundance and fishing access availability both impacted the success of the summer bass season. Particularly, the recent administrative rule change regarding closing of fishing within the Port of Indiana to all recreational watercraft, including fishing from a boat (Indiana Administrative Code 130 IAC 4-1-11).

The largest decline in boat catch occurred at two ports, East Chicago and Burns Waterway from 2002 to 2003 (Palla 2004). However, the largest decline in effort was observed at Burns Waterway, which is closest to the Port of Indiana.

Of the bass released, the number of sub-legal-sized black bass (less than 14.0 inches) was higher than the number of legal-sized ($\geq$14.0 inches) black bass in the shore fishery. Within the boat fishery, the number of legal-sized bass was higher than sub-legal-sized bass.

Species Preference
Boat, shore/pier and stream anglers were all questioned which species of fish they preferred to catch from Lake Michigan. A total of 3,903 anglers responded. Sixty-five percent of boat anglers included at least one salmonid in their response. On a species by species basis, boat anglers ranked yellow perch (37%) as their most preferred fish, followed by any trout or salmon species (17%), steelhead (13%), coho salmon (13%), Chinook salmon (10%), and bass (7%). Forty-nine percent of shore anglers included at least one salmonid in their reply. By species, shore anglers also ranked yellow perch as their most preferred fish (44%), followed by steelhead (17%), coho salmon (10%), any trout or salmon species (7%), bass (6%), Chinook salmon (6%), and no preference (3%). Stream anglers ranked steelhead as their most preferred fish (56%), followed by any trout or salmon (36%), Chinook salmon (3%) and coho salmon (1%).

Angler Residency
Of the 3,939 parties interviewed, 3,903 (1,341 shore/pier; 1,352 boat and 1,210 stream) responded to the county of residence question. Thirty percent (1,159) were from Lake County, 17.3% (674) were from Porter County and 14.9% (580) were from LaPorte County. Out-of-state angler parties comprised 23.0% of the total. Anglers representing sixty other Indiana counties fished Lake Michigan and its tributaries of Trail Creek, East branch of the Little Calumet River and Salt Creek during 2003.

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